In the Claims:

1. (Currently Amended) A method of applying a gray neutrality calibration to a color signal, said method comprising:

representing said color signal as a position in a multi dimensional color space, in which each said dimension of said color space represents a respective primary color;

defining a gray axis in said multi dimensional color space as a set of coordinates for which a plurality of said primary colors each have a same value as each other;

determining a distance between said position representing said color signal and said gray axis; ~~and~~

using said determined distance between said color signal position and said gray axis to apply a gray neutrality correction to said input color signal; and

for color signal having a position corresponding to a maximum saturated value of at least one said primary color, applying a 0 correction to said color signal.

2. (Original) The method as claimed in claim 1, wherein said determined distance is determined as a grayness function defined as;

g(color)=min(color)/max(color) max(color)>0

g(color)=1 max(color)=0

where g (color) is the grayness function; and

(color) is a value of a color signal.

3. (Cancelled).

4. (Cancelled)

5. (Cancelled)

6. (Original) The method as claimed in claim 1, wherein said primary colors are non-black primary colors.

7. (Original) The method as claimed in claim 1, further comprising:

applying a first set of gray balancing color corrections to a printer's gray axis, a second set of different color corrections to a printer's gamut surface, and continuously varying intermediate color corrections everywhere else in the gamut;

calculating a grayness function which evaluates the distance to the gray axis for a plurality of color signals each carrying a single color data of a multi-dimensional image data;

using the value of said grayness function and its complement as weights for a linear combination of two sets of color corrections applied to a said plurality of color signals; and

generating an output of said linear combination of color corrections, such that an input into a said color signal channel for a color combination which lies upon the printer's gray axis is affected only by said first set of color corrections, an input into a said color signal channel for a color combination which lies upon the gamut surface is affected only by said second set of color corrections, and an input into a said color signal channel for a color combination which lies in between the gray axis and the gamut surface is affected by both said sets of color corrections,

as a function of the distance between said color combination and the gray axis and the distance between the color combination and the gamut surface, respectively.

8. (Original) The method as claimed in claim 1, further comprising:

applying a first set of gray balancing color corrections to a printer's gray axis, a second set of different color corrections to a printer's gamut surface, and continuously varying intermediate color corrections everywhere else in the gamut;

calculating a grayness function which evaluates the distance to the gray axis for a plurality of color signals each carrying a single color data of a multi-dimensional image data;

using the value of said grayness function and its complement as weights for a linear combination of two sets of color corrections applied to a said plurality of color signals; and

generating an output of said linear combination of color corrections, such that an input into a said color signal channel for a color combination which lies upon the printer's gray axis is affected only by said first set of color corrections, an input into a said color signal channel for a color combination which lies upon the gamut surface is affected only by said second set of color corrections, and an input into a said color signal channel for a color combination which lies in between the gray axis and the gamut surface is affected by both said sets of color corrections, as a function of the distance between said color combination and the gray axis and the distance between the color combination and the gamut surface, respectively, wherein the two sets of color corrections are both one dimensional.

9. (Original) The method as claimed in claim 1, comprising:

generating a multi-dimensional look up table for installation into a printer device for applying a gray neutrality calibration data to a multi-dimensional image data;

applying a weighted transfer function to a data input of each of a plurality of color signal channels each carrying a single color data of said multi-dimensional image data; and

generating an output of said transfer function, such that an input into a said color signal channel for a color combination which lies upon a gamut surface remains unaffected by said transfer function.

10. (Original) The method as claimed in claim 1, comprising:

generating a multi-dimensional look up table for installation into a printer device for applying a gray neutrality calibration data to a multi-dimensional image data;

applying a weighted transfer function to a data input of each of a plurality of color signal channels each carrying a single color data of said multi-dimensional image data; and

generating an output of said transfer function, such that an input into a said color signal channel for a color combination which lies upon a gamut surface remains unaffected by said transfer function;

wherein said process of generating a multi-dimensional look up table data comprises storing data in each of a plurality of dimensions, each dimension corresponding to a respective color channel.

11. (Original) The method as claimed in claim 1, comprising:

generating a multi-dimensional look up table for installation into a printer device for applying a gray neutrality calibration data to a multi-dimensional image data;

applying a weighted transfer function to a data input of each of a plurality of color signal channels each carrying a single color data of said multi-dimensional image data;

generating an output of said transfer function, such that an input into a said color signal channel for a color combination which lies upon a gamut surface remains unaffected by said transfer function;

identifying a set of individual control points within said multi-dimensional look up table data; and

normalizing said control points to a maximum signal value.

12. (Original) The method as claimed in claim 1, comprising:

generating a multi-dimensional look up table for installation into a printer device for applying a gray neutrality calibration data to a multi-dimensional image data;

applying a weighted transfer function to a data input of each of a plurality of color signal channels each carrying a single color data of said multi-dimensional image data; and

generating an output of said transfer function, such that an input into a said color signal channel for a color combination which lies upon a gamut surface remains unaffected by said transfer function;

wherein an input data into said plurality of color signal channels comprises a 4 dimensional image data having data for cyan, magenta, yellow and black colors.

13. (Original) The method as claimed in claim 1, comprising:

generating a multi-dimensional look up table for installation into a printer device for applying a gray neutrality calibration data to a multi-dimensional image data;

applying a weighted transfer function to a data input of each of a plurality of color signal channels each carrying a single color data of said multi-dimensional image data; and

generating an output of said transfer function, such that an input into a said color signal channel for a color combination which lies upon a gamut surface remains unaffected by said transfer function;

said method comprising generating a plurality of said multi-dimensional look up tables, each corresponding to a particular combination of:

ink type;

media type; and

printer resolution.

14. (Original) The method as claimed in claim 1, comprising:

determining a grayness function defined as:

g(color)=min(color)/max(color) max(color)>0

g(color)=1 max(color)=0

where g(color) is the grayness function, and (color) c is a value of color signal in a said color signal channel.

15. (Original) The method as claimed in claim 1, comprising:

generating a multi-dimensional look up table for installation into a printer device for applying a gray neutrality calibration data to a multi-dimensional image data;

applying a weighted transfer function to a data input of each of a plurality of color signal channels each carrying a single color data of said multi-dimensional image data; and generating an output of said transfer function, such that an input into a said color signal channel for a color combination which lies upon a gamut surface remains unaffected by said transfer function;

wherein said multi-dimensional look up table comprises an arbitrary number of control points in each said dimension, where the values at each control point are given by the following equations;

c'=g(c,m,y)*GNCc(c)+(1-g(c,m,y))*ID(c)

m'=g(c,m,y)*GNCm(m)+(1-g(c,m,y))*ID(m)

y'=g(c,m,y)*GNCy(y)+(1-g(c,m,y))*I- D(y)

k'=ID(k)

where GNC is a gray neutrality transfer function;

ID is an identify transfer function; and

g is a grayness function.

16. (Currently Amended) The method as claimed in claim 1, comprising:

generating a multi-dimensional look up table for installation into a printer device for applying a gray neutrality calibration data to a multi-dimensional image data;

applying a weighted transfer function to a data input of each of a plurality of color signal channels each carrying a single color data of said multi-dimensional image data; and

generating an output of said transfer function, such that an input into a said color signal channel for a color combination which lies upon a gamut surface remains unaffected by said transfer function;

wherein said multi-dimensional look up table comprises an arbitrary number of control points in each said dimension, where the values at each control point are given by the following equations;

~~color=g(color)*GNCcolor(color)+(1-g(color))*ID(color)~~

color'=g(color)*GNCcolor(color)+(1-g(color))*ID(color)

~~k=ID(k)~~

k'=ID(k)

where GNC(color) is a gray neutrality transfer function for a particular color channel;

g(color) is a grayness function;

ID(color) is an identify transfer function for a particular color; and

k is a color black signal.

17. (Currently Amended) A printer device for printing image data, said printer device comprising:

a printer mechanism having a media transport mechanism, a printer head mechanism and; a print channel capable of inputting a multi-dimensional image data; and

a multi dimensional look up table capable of applying a gray neutrality function to said multi dimensional image data, wherein said multi dimensional lookup table is generated by:

representing said color signal and said gray axis; and

using said determined distance between said color signal position and said gray axis to apply a gray neutrality correction to said input color ~~signal~~ signal;

wherein said multi-dimensional look up table comprises an arbitrary number of control points in each dimension, wherein the output values at each control point are given by a linear combination of a gray neutrality transfer function GNC and an identity transfer function ID weighted by the grayness function g and its complement respectively.

18. (Currently Amended) A printer device for printing image data, said printer device comprising:

a printer mechanism having a media transport mechanism, a printer head mechanism and; a print channel capable of inputting a multi-dimensional image data; and

a multi dimensional look up table capable of applying a gray neutrality function to said multi dimensional image data, wherein said multi dimensional lookup table is generated by:

representing said color signal and said gray axis; and

using said determined distance between said color signal position and said gray axis to apply a gray neutrality correction to said input color signal;

~~The printer device as claimed in claim 17,~~ wherein said multi dimensional look up table is generated as an output of a grayness function, said grayness function ~~defined as;~~ defined as:

~~g(c,m,y)=min(c,m,y)/max(c,m,y) max(c,m,y)>0~~

g(c,m,y)=min(c,m,y)/max(c,m,y) max(c,m,y)>0

g(c,m,y)=1 max(c,m,y)=0

where g(c,m,y) is the grayness function; and c is a value of a cyan color data; and m is a value of a magenta color data; and y is a value of a yellow color data.

19. (Cancelled)

20. (Currently Amended) A printer device for printing image data, said printer device comprising:

a printer mechanism having a media transport mechanism, a printer head mechanism and; a print channel capable of inputting a multi-dimensional image data; and

a multi dimensional look up table capable of applying a gray neutrality function to said multi dimensional image data, wherein said multi dimensional lookup table is generated by:

representing said color signal and said gray axis; and

using said determined distance between said color signal position and said gray axis to apply a gray neutrality correction to said input color signal;

~~The printer device as claimed in claim 17,~~ wherein said multi-dimensional look up table comprises an arbitrary number of control points in each said dimension, wherein the values at each control point are given by the following equations;

c'=g(c,m,y)*GNCc(c)+(1-g(c,m,y))*ID- (c)

m'=g(c,m,y)*GNCm(m)+(1-g(c,m,y))*ID(m)

y'=g(c,m,y)*GNCy(y)+(1-g(c,m,y)-)*ID(y)

k'=ID(k)

where GNC is a gray neutrality transfer function;

ID is an identify transfer function; and

g is a grayness function.

21. (Cancelled)

22. (Cancelled)

23. (New) A method of applying a gray neutrality calibration to a color signal, said method comprising:

representing said color signal as a position in a multi dimensional color space, in which each said dimension of said color space represents a respective primary color;

defining a gray axis in said multi dimensional color space as a set of coordinates for which a plurality of said primary colors each have a same value as each other;

determining a distance between said position representing said color signal and said gray axis;

using said determined distance between said color signal position and said gray axis to apply a gray neutrality correction to said input color signal; and

for a color signal having a position on said gray axis wherein said color signal has equal values of each of said plurality of primary colors, applying a full value of said correction.

24. (New) A method of applying a gray neutrality calibration to a color signal, said method comprising:

representing said color signal as a position in a multi dimensional color space, in which each said dimension of said color space represents a respective primary color;

defining a gray axis in said multi dimensional color space as a set of coordinates for which a plurality of said primary colors each have a same value as each other;

determining a distance between said position representing said color signal and said gray axis;

using said determined distance between said color signal position and said gray axis to apply a gray neutrality correction to said input color signal;

normalizing each of said primary colors to have values in a range 0 to 1;

representing each position on said gray axis by a value of 1; and

representing all points on a gamut surface of said color space by a value 0, except where said gray axis coincides with said gamut surface.